

## AFRL/DAGSI select annual research awards

by Jill Bohn, AFRL Public Affairs

WRIGHT-PATTERSON AFB, Ohio ---

Research teams for 21 winning projects received word on partial funding Feb. 16 during the Joint Air Force Research Laboratory (AFRL)/Dayton Area Graduate Studies Institute (DAGSI) Research Program's 2<sup>nd</sup> Annual Symposium.

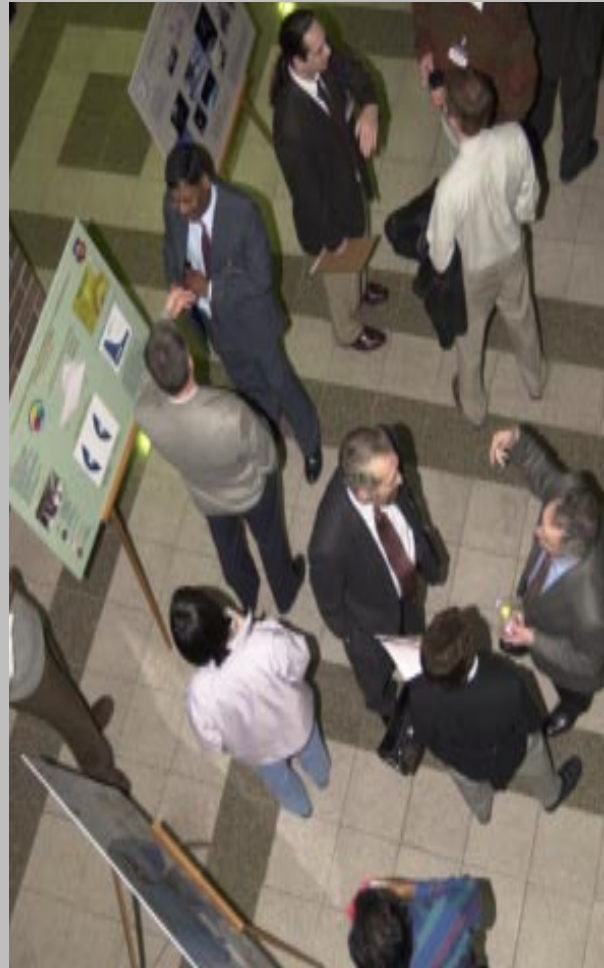
The winning projects were selected from a field of more than 100 preproposals by the Program Selection Panel, whose members represent the AFRL, Ohio industry, and Ohio Board of Regents.

The one-day event staged at Air Force Institute of Technology (AFIT) headquarters, included a review of progress on the previously funded research projects and a poster board display summarizing those reviews by award winners from AFIT, Ohio State University, University of Cincinnati, University of Dayton and Wright State University.

"Over its three year existence, the program has involved over 450 Ohio faculty and students, and over 160 AFRL scientists and engineers, working on over 48 projects valued at approximately \$39 million," DAGSI Director Frank Moore said prior to the announcement of this year's award recipients. "So far we are doing okay."

Since 1998, the Joint AFRL/DAGSI Aerospace Basic Research Program has worked toward the support of faculty and graduate students at Ohio engineering and science graduate schools, based on AFRL requests using AFRL on-site resources. Awards support collaborative basic research between the U.S. Air Force, and the state of Ohio through the Ohio Board of Regents, provides \$4 million per year to support participation by Ohio research faculty and students.

Air Vehicles research projects will include the multidisciplinary design tool to facilitate certification of aerospace components, alternative means of flow control over a lifting surface, controlling manifesta-



**HERE, THERE, EVERYWHERE** — This overhead shot was taken in the lobby at the 2<sup>nd</sup> Annual Joint AFRL/DAGSI Symposium. The day long-event held at the Air Force Institute of Technology headquarters. Research funding for 21 winning projects was announced during the event held Feb. 16.

tions of high frequency, high amplitude disturbances, and the development and investigation of plasmas in the Mach 5.8 wind tunnel facilities.

Winning projects in the area of Sensors Technologies will focus on advancement of the multi-stage, interferometric radar signal processing technology to enhance radar clutter suppression capabilities, understanding of aero-optical distortion in turbulence and its control and modeling, improvement of target detection performance and performance predictions for airborne radar, and facilitating accurate mixed-signal network simulation and verification prior to acquisition.

The lone winner in the Information Technologies category will explore and develop new approaches and methods of data handling.

Awards for proposed Materials Technologies projects are development of new non-destructive evaluation methods to prevent/reduce failures of airfoil-blade attachments in turbine engines, development of process modeling tools to predict microstructures of laser-based material build-up, faster development and implementation of oxide-based structural components, and development of a new class of aligned, nanotube reinforced thermoset composite materials.

Proposed Propulsion Technologies projects cover the investigation of free radicals in a supersonic flow using a radio frequency, development of fuel injection schemes which accelerate the mixing process, explore technologies critical to development of a “Smart Nozzle”, and understanding the physical processes that cause spallation around high-pressure turbine cane film cooling holes.

Projects to be covered by Human Effectiveness Technologies are how the use of multi-sensory virtual interfaces (VIs) interacts with changes in display fidelity, visual, vestibular and other cues that impact a pilot’s mental model of in-flight spatial orientation, using gene sets in toxicology studies to develop tools to organize, visualize and integrate new data sets, and examination of physiological impact of workload in executing dynamic supervisory control of distributed vehicles in a simulated unmanned combat air vehicles formation.

**Air Vehicles Technologies project winners are –**

“Analytical Certification and Multidisciplinary Design”, Lt. Col. Robert A. Canfield, AFIT (Partners – WSU, University of Toledo (UT), and AFRL/VAS);

“Design and Analysis of Active Flow Control”, Dr. Ephraim J Gutmark, UC (Partners – AFIT, Ohio University (OU), AFRL/VACA, and AFRL/MNA);

“High Frequency, Inertial Subrange Excitation for Directed Energy, Weapon Bay, and Reacting Flow Applications”, Dr. Mo Samimy, OSU (Partners – UC, AFRL/VAAI, AFRL/VA, AFRL/PRA);

“Generation and Characterization of Stable, Weakly Ionized Air Plasmas in Hypersonic Flows”, Dr. J. William Rich, OSU (Partners – AFIT, WSU, AFRL/VAA).

**Sensors Technologies award winners are as follows –**

“Interferometric Radar Clutter Suppression”, Dr. Michael A. Temple, AFIT (Partners – UD, WSU, AFRL/SN, AFRL/SNRP, AFRL/SART);

“Prediction and Control of Aero-Optic Aberrations”, Dr. Mo Samimy, OSU (Partners – UD, AFRL/SNJM, AFRL/SN, AFRL/VA);

“Performance Assessment for Foliage Penetrating Radar Target Detection”, Dr. Randolph L. Moses, OSU (Partners – WSU, AFIT, AFRL/SNAA, AFRL/SNR, AFRL/SNA, AFRL/SNRR);

“Mixed Signal Modeling for System Level Simulation”, Dr. Ranganadha Vemuri, UC (Partners – WSU, OSU, AFRL/SND, AFRL/SNDM).

**The category winner for Information Technologies is --**

“Content-Based 3D Information Compression for Real-Time Image and Signal Detection”, Dr. Yuan F. Zheng, OSU (Partners 0 UC, AFIT, UD, AFRL/IFTA).

**Winners for the Materials Technologies projects include –**

“Nondestructive Evaluation Methods to Quantify Fretting Damage in Materials”, Dr. Peter B. Nagy, UC (Partners: AFIT, AFRL/MLLP, AFRL/MLLN);

“Prediction and Control of Microstructure in Laser-Based Solid Freeform Fabrication of Aerospace Materials”, Dr. Nathan W. Klingbeil, WSU (Partners – OSU, AFRL/MLLMP);

“A Novel MEMS-Based, Combinational Chemistry Approach to Measure Interfacial Strength in Advanced Materials”, Dr. Peter M. Anderson, OSU (Partners – Case Western Reserve University, AFRL/ML, AFRL/MLLN);

“Carbon Nanotube-Reinforced Liquid Crystal Structural Composites by Electron Beam Curing”, Dr. Richard P. Chartoff, UD (Partners – UC, Kent State University, AFRL/MLBC, AFRL/MLBP).

**Propulsion Technologies winners are –**

“Studies of Non-Thermal Ignition Phenomena for Aerospace Applications”, Dr. Vish Subramaniam, OSU (Partners – UC, AFRL/PR, AFRL/PRPS);

“High Speed, Air Breathing Propulsion”, Dr. Ephraim J. Gutmark, UC (Partners – OSU, AFRL/PRA);

“Development of Technologies for ‘Smart-Nozzle’ Applications”, Dr. Gilbert E. Pacey, Miami University (Partners –

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WSU, AFRL/PRTSS, AFRL/PRTG);

“Flow Physics of Incomplete Combustion Product Interaction with Film Cooling Holes”, Dr. Paul D. Orkwis, UC (Partners – WSU, AFRL/PRTC, AFRL/PRTT).

**Human Effectiveness Technologies projects to receive funding are –**

“Robotic Systems for On-Orbit Servicing”, Dr. Janet M. Weisenberger, OSU (Partners – WSU, AFIT, AFRL/HEC, AFRL/HECP);

“Pilot Spatial Orientation”, Dr. Curtis H. Spenny, AFIT (Partners – WSU, AFRL/HEC, AFRL/HEM, AFRL/HEP);

“Bioinformatic Support for Toxicogenomics”, Dr. Brent D. Foy, WSU (Partners – OSU, AFIT, AFRL/HEC);

“Adaptive Aiding Using Physiological Operator Functional State Assessment”, Dr. Ling Rothrock, WSU (Partners – WSU, AFRL/HEC). @